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ABSTRACT

Two teams, each comprised of teachers, a researcher, and a trainer/developer spent fifteen and a half months implementing the Interactive Research and Development on Teaching (IR&DT) strategy, a specialized educational research methodology stressing interactive rather than linear communication between teachers and researchers. These teams are studied and discussed in this executive summary of the IR&DT Study. The report includes a discussion of the essential features of IR&DT, assumptions underlying the strategy, a description of the Vermont and California sites which participated in the study, evaluation of the IR&DT teams' outcomes, summary of useful information resulting from the research, and recommendations for future study. (Author/LH)

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Interactive Research and Development on Teaching

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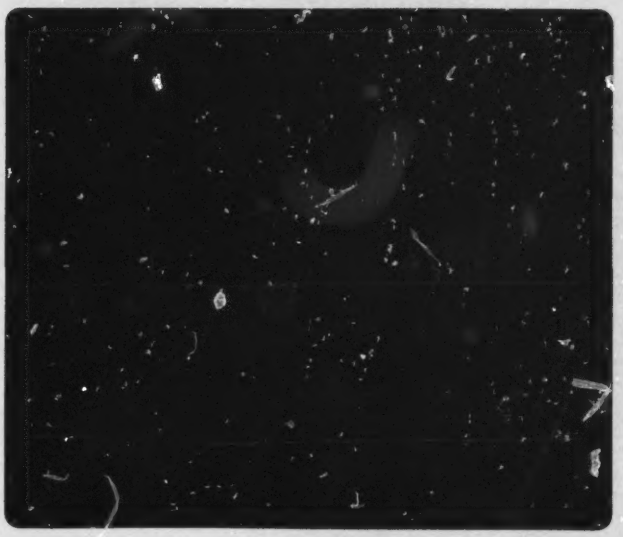

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Interactive Research and Development on Teaching

INTERACTIVE RESEARCH AND DEVELOPMENT
ON TEACHING

EXECUTIVE SUMMARY

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Report IR&DT-79-12

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PREFACE

Innovations in education that are of an enduring nature and have major impact are rare. Since its inception as a fledgling idea at the Far West Laboratory in 1975, *Interactive Research and Development on Teaching (IR&DT)* has been watched with considerable interest nationally as holding such promise. It now appears that this promise may be much nearer realization.

This Executive Summary of the final report of the IR&DT Study presents important findings from that study. Historically, persons charged with enacting separate pieces of the educational research-development-dissemination-implementation continuum have tended to work in isolation from one another and from the so-called practitioner who ostensibly is the recipient of the outcomes and products of their work. Perhaps unintentionally, the processes of conducting "research" and "development" became distinctly separate operations from those of facilitating "dissemination" and "implementation" thus seldom involving those individuals who were to apply the outcomes. As IR&DT has shown, this need not be so.

As with all such endeavors, the conceptualization and study of IR&DT was the product of considerable creative energy and hard work on the part of numerous people. It is my pleasure to commend them to the reader and to congratulate them for their considerable contributions.

Two teams each comprised of teachers, a researcher, and a trainer/developer spent 15 1/2 months implementing the IR&DT strategy and in the process served as subjects for the IR&DT Study. One team was located in San Diego, California, and was composed of employees of the San Diego Unified School District. The team included Cindy Chase, Jane Day, and Charlotte Lazar, teachers

at Horton Elementary School, and Janice Bennett, a teacher at Erickson Elementary School; Dave Mittleholtz, a resource teacher with the office who served as trainer/developer; and Grant Behnke from the research and program evaluation office who served as researcher. In addition, Linden Courter, Director of Staff Development, provided critically important administrative support. The other team was located in Vermont. Teachers who participated were from the Underhill Independent School and School District and included Mary Calder, Irene Mayer and Nancy Pecor. The trainer/developer and researcher were Phyllis Paolucci-Whitcomb and Charles Rathbone, both members of the faculty of the College of Education and Social Services, University of Vermont. Ken Fishell, Academic Vice President, University of Vermont served as primary site administrator. For their diligence, dedication, courage, and the contributions they have made to the educational r and d field, they are deserving of eminent praise.

A National Advisory Panel (NAP) served as external critics and advisers to both the IR&DT Study staff and the IR&DT teams. Selected to reflect the perspectives of the variety of constituencies potentially affected by outcomes of the study, members of the NAP were Walter Doyle, North Texas State University; Carolyn Evertson, R & D Center for Teacher Education, University of Texas, Austin, Texas; Del Schalock, Oregon College of Education; and Carolyn Trimble, Peralta School, Oakland Unified School District (California). Their objectivity contributed greatly to the shaping both of the IR&DT Study as it commenced and the research and development carried out by the teams. They are to be congratulated for their contribution to the effort.

IR&DT was funded by the National Institute of Education, Teaching and Learning Division. Because of the unusual nature of the IR&DT Study proposal, considerable energy was expended in specifying and clarifying the work scope.

In particular, the time and efforts of several persons contributed to the project's success. Virginia Koehler, Chief, Teaching and Learing Division, figures prominently in the early conceptualizing of the project and provided program support in meeting federal contractual requirements as well as continued advocacy of the idea at the Institute. Esther Perry served as Program Monitor for the project and spent countless hours in collaboration with the principal investigators, solving the numerous problems an innovative project like IR&DT created. Kent Viehover provided early conceptual input to the study design. Ray Wormwood, Contracts and Grants Management Division, was instrumental in providing technical support to contract specification and negotiation. For their interest in and guidance of the project as it developed, they are deserving of much of the credit for its success.

Evaluation of the IR&DT strategy required an objective and perceptive eye. This was provided by Gary A. Griffin, Teachers College, Columbia University, initially as a Visiting Scholar in 1977-78 when he spent his sabbatical leave at the Laboratory and afterward in addition to his duties at Teachers College. His creativity in designing procedures for monitoring and analyzing data in relation to implementation of the strategy contributed significantly to the successful outcome of the study. In addition, he participated with the principal investigators in developing conclusions and recommendations and in writing the final report.

Finally, IR&DT study is the result of the initiative of Beatrice A. Ward, Deputy Laboratory Director, and William J. Tikunoff, Chairperson, Programs on Schooling who also served as director of the project. More than anything else, their work provided a model of intellectual integrity and persistence derived from a broad knowledge of the practices of research, development, and classroom instruction. I am sure that everyone who has watched IR&DT develop from the

initial idea under their care and nurturance joins me in congratulating them for contributing to the field what no doubt will be recognized as a landmark study.

Public education currently is experiencing a most crucial time in its history. Solutions must be found to problems confronting us daily, and in order to do so, procedures must be developed to engage educational personnel and relevant others in problem solution. IR&DT provides one proven, successful way to go about conducting relevant eductional r and d which at the same time attends to solving real problems. It is my sincere hope that it will be used wisely, but that we also will continue to inquire into and develop other appropriate vehicles for attaching educational problems.

John K. Hemphill

Laboratory Director

TABLE OF CONTENTS

Page

Preface.....iii

Essential Features of IR&DT.....1
- Team Composition.....2
- Collaboration.....2
- Problem-Solving Focus.....3
- Concurrent R and D.....3
- Maintaining Integrity of the Classroom.....3
- Intervention Strategy.....3

Assumptions Underlying IR&DT.....4

Participants in IR&DT Implementation.....4
- California Site.....4
- Vermont Site.....5

R and D at Each Site.....6

IR&DT Implementation.....7
- Team Composition.....8
- Collaboration.....9
- Problem Solving Focus.....11
- Conducting Concurrent R and D.....11
- Maintaining the Integrity of the Classroom.....1[illegible]
- IR&DT as an Intervention Strategy.....1[illegible]

Judgment of IR&DT Teams' R and D Outcomes.....13
- Rigor and Usefulness of R and D Produced by IR&DT Teams.....14
- Content and Characteristics of Rigor and Usefulness Criteria.....15

What Was Learned About Implementing IR&DT.....17
- Finding No. 1.....17
- Finding No. 2.....18
- Finding No. 3.....18
- Finding No. 4.....19
- Finding No. 5.....19
- Finding No. 6.....20

Future Recommendations.....21
- Recommendation 1.....21
- Recommendation 2.....22
- Recommendation 3.....23
- Recommendation 4.....24
- Recommendation 5.....25

EXECUTIVE SUMMARY

Interactive Research and Development on Teaching (IR&DT) was proposed in 1975 by Ward and Tikunoff as an alternative educational r and d strategy. The basis for this recommendation built from demonstrated inadequacies of the characteristics and outcomes of the commonly-used linear r and d strategy. These include conduct of research on teaching by persons knowledgeable about but usually not involved in the process of classroom instruction, and development of products applying this research by persons who also are not engaged as classroom teachers. This, in turn, frequently results in answers to questions teachers are not asking or solutions to problems they consider to be less than critical. In addition, when important and needed outcomes are obtained, findings usually are presented in language that is largely unfamiliar and uninterpretable at the classroom level. Further, in a linear r and d approach, the teacher is viewed as a "consumer" and "adopter" of r and d outcomes rather than as a participant in the process of school improvement. Finally, in a linear approach, because each step in the r and d process is discrete and separated from the others, the time required from research to classroom application, if and when it occurs, often is 5-10 years.

Subsequent to the 1975 proposal, the National Institute of Education, Division of Teaching, funded an investigation of IR&DT in order:

- to investigate and understand the process of implementing IR&DT in order to identify and describe the requirements and characteristics for "successful" use of the strategy,
- to determine whether the r and d outcomes that result from an IR&DT approach provide important and useful new information, procedures, and processes to the field of education while successfullly achieving (maintaining) commonly accepted r and d standards, and
- to determine what changes, if any, in persons and institutions might result from participation in IR&DT.

The following discussion provides a summary of the outcomes of the IR&DT Study. A complete report is available: Tikunoff, W.J., Ward, B.A., and Griffin, G.A. Interactive Research and Development on Teaching Study. Far West Laboratory for Educational Research and Development, 1979, Report No. IR&DT 79-11.

Essential Features of IR&DT

The title, Interactive Research and Development, was selected purposefully to give prominence to the undergirding principles of the strategy. IR&DT places teachers, researchers, and trainer/developers together to inquire as a team, beginning with the initiation of the r and d process, into those questions, problems and concerns of classroom teachers. An IR&DT team is charged with conducting research and concurrently attending to the development of

training based both on their research findings and the research methods and procedures employed in their study. Decisions are made collaboratively. For IR&DT, this means that each member of the team has parity and shares equal responsibility for the team's decisions and actions, from identification of the question/problem through completion of all resultant r and d activities.

In all, six major features must be present for an r and d effort to be judged interactive. While certain of the features may exist in a more or less ideal form, all must be manifest in some way. They include: (1) r and d team composition, (2) the nature of collaboration, (3) problem-solving focus, (4) conducting concurrent r and d, (5) maintaining the integrity of the classroom, and (6) recognition of the strategy as an intervention as well as an r and d process.

Team Composition

Minimally, the team must be composed of a teacher--that practitioner who is reponsible for the day-to-day conduct of the schooling process; a researcher --that practitioner whose major day-to-day responsibilities are to inquire systematically into the teaching and learning process in order to ask questions, gain new knowledge, and/or resolve problems; a trainer/developer--that practitioner who is responsible for designing and providing preservice training of teachers, professional development opportunities for teachers-in-service, and/or technical assistance at the classroom level.

Collaboration

Teachers, researchers, and trainer/developers are each assumed to bring unique contributions to conducting r and d on teaching. Thus, within IR&DT, collaboration means teachers, researchers, and trainer/developers working with parity and assuming equal responsibility to identify, inquire into, and resolve the problems/concerns of classroom teachers. Such collaboration recognizes and utilizes the unique insights and skills provided by each participant while, at the same time, demanding that no set of capabilities is assigned a superior status. It assumes a work with rather than a work on posture--the latter more frequently being the modus operandi when teachers are asked to join researchers or trainer/developers in a linear r and d endeavor. Parity is granted when team members agree to participate in IR&DT. Equal sharing of responsibility is achieved only when each team member assumes his or her share based on his or her unique abilities and insights.

The interactiveness of an IR&DT effort, then, is determined in part by the degree to which IR&DT team members, regardless of professional role, are able to command the attention of the team at each step of an r and d process (parity), and the extent to which team members offer successfully their unique perspectives, knowledge, and skill and engage collaboratively in the accomplishment of the various tasks undertaken by the team (assuming equal responsibility).

Problem-Solving Focus

IR&DT focuses on solving classroom problems which practicing classroom teachers perceive to be important. Thus, while in IR&DT the problems must emerge from the mutual concerns and inquiries of the team, above all, they must attend to teachers' problems.

Concurrent R and D

While an IR&DT team is to produce a piece of research,--i.e., identify a problem, select an appropriate research methodology, select and/or develop and employ appropriate data collection and analysis procedures, and interpret and report findings--inclusion of a trainer/developer on the team introduces the capability of concurrently attending to the development of training procedures and processes that grow out of the IR&DT research effort.

By attending to development concerns from the beginning of an r and d effort, in addition to applying research findings in a training program, it is possible to employ as training foci the procedures utilized to identify the problem under investigation as well as the data collection and analysis procedures from the research. Since training programs can be developed that build others' capabilities to inquire in their own classrooms into the same aspects of teaching and learning as are being studied concurrently by the IR&DT team, development need not await completion of the entire research process. As a result, at the same time the research findings are reported, training strategies already may be developed that utilize both the techniques devised to study and resolve the specified problem and the research findings.

Maintaining Integrity of the Classroom

It is only natural for the IR&DT strategy to be sensitive both to the complexity of the classroom setting and to the extent to which r and d may interfere with this setting. Inclusion of at least one teacher (and more likely two or more teachers) on an IR&DT team should highlight these sensitivities and cause the researcher and trainer/developer to select and use data sources, data collection procedures, training procedures, etc., that do not intrude upon the naturalness of the everyday settings in which teaching and learning occur.

Intervention Strategy

IR&DT, while leaving the teacher, researcher, and trainer/developer roles as intact as possible, proposes certain alterations in the conventional functions of those individuals. For example, through involvement in all types of research and development decision-making, teachers may acquire new mind sets geared toward inquiry into their own ongoing teaching-learning concerns, thus gaining practical experience with r and d tools that can be used to investigate and resolve these concerns. The researcher, through involvement with teachers, may identify new research procedures and methods, become aware of critical research issues he or she had not considered previously, and gain credibility

with teachers in general. The trainer/developer may acquire new skill and insights into building staff development agendas that emerge from teachers' concerns.

Institutional settings--e.g., the classroom, the school, the school district, the institution of higher education--also may be required to change in order to accommodate the mutual and individual interests and concerns of the participants and the modifications in teaching, learning, and teacher training that may result.

Assumptions Underlying IR&DT

Four major assumptions form the foundation for the IR&DT strategy. These build from the knowledge gleaned from the experiences of those involved in educational r and d, both recently and over the past several decades. They include:

- Participative r and d strategies which include teachers are needed.
- IR&DT will contribute to educational knowledge and theory building.
- The results of IR&DT will be generalizable, particularly at a logical-situational level.
- Participants' unique skills and perspectives will contribute to the success of IR&DT.

Participants in IR&DT Implementation

For purposes of the IR&DT Study, the strategy was implemented at two sites --one in an urban setting in California, the other in a rural setting in Vermont. The settings were selected purposely in order to observe IR&DT implementation under diverse circumstances.

California Site

The California site was located in the San Diego Unified School District, San Diego, California, the ninth largest municipality in the United States. This is a large, urban public school system which served 118,697 students in the 1977-78 school year.

The California IR&DT team included four teachers, one researcher, and one trainer/developer, all on the school district staff.

Three teachers (at kindergarten, 1st and 2nd grades) taught in an elementary school in a lower socio-economic neighborhood. In 1977-[illegible] the student enrollment

in the school was approximately 400 with 75 percent Black, 20 percent Hispanic, 3 percent Asian American, and 2 percent white students. Eight-five percent of the students were eligible for free lunch and an additional 13 percent qualified for reduced-price lunch. The fourth teacher taught a combination 3rd-4th grade class in another elementary school in the district. This school served 1200 students, 77 percent of whom were white, 11 percent Hispanic, 9 percent Asian American, and 3 percent Black. Both schools included innovative programs --the first, Follow Through, the California School Improvement Program, and ESEA Title I and other categorical aid efforts; the second conducted a special district-wide program for gifted students.

The researcher on the California team was on the district's research and evaluation staff. He had taught high school mathematics and had served as a resource teacher for the district prior to becoming a program evaluator.

The trainer/developer was employed as a curriculum resource teacher in the school district. Prior to undertaking this assignment, he had taught sixth grade for 11 years.

Two teachers and the trainer/developer had completed Masters' degrees. The researcher completed his doctorate while involved with IR&

Vermont Site

The Vermont site included two cooperating institutions--the College of Education and Social Services, University of Vermont and the Underhill Independent School District.

In 1977-78, the college--located in Burlington, Vermont, a city of some 40,000 people--served approximately 1,000 students of whom some 120 were enrolled in the preservice elementary teaching program.

The school district is part of a supervisory union school district which is a loosely connected federation of seven small independent districts, each with its own board of education but served by one superintendent and his staff. The Underhill Independent District includes only one school, an elementary school serving grades kindergarten through four. In 1977-78, the school enrolled 130 students, most of whom were white. The faculty was comprised of five teachers including the teacher/principal.

The Vermont IR&DT team included three teachers who taught in the Underhill School at kindergarten, grade 1 and grade 3, one researcher, and two trainer/developers, one who worked with the team for the first two months of IR&DT implementation and one who was on the team from the middle of the third month of implementation through the completion of the process.

The researcher and both trainer/developers were on the faculty of the College of Education and Social Services. The researcher had had two years teaching experience. Both trainer/developers had taught school, the second having had more teaching experience than the first. The researcher had completed a doctoral degree, the trainer/developers both had Masters' degrees

(the second was involved in doctoral studies while participating in the IR&DT effort). None of the teachers had advanced degrees.

Underhill School had not been involved previous in innovative educational programs or projects. The College had planned and implemented several innovative preservice teacher training programs, one of which had won national recognition.

R and D at Each Site

The question upon which the California IR&DT team focused its research was:

> What are the strategies and techniques which classroom teachers use to cope with distractions to classroom instruction and how effective are these techniques?

Inasmuch as the school district was devoting attention to the importance of students' "time-on-task" (i.e., the amount of time students are engaged in meaningful learning activities), this question was considered to be particularly appropriate and timely by teachers and others in the district.

The purpose of the research study, then, was to examine the techniques classroom teachers used to cope with distractions to classroom instruction and to determine how effective these techniques were with respect to: (1) minimizing instructional time lost due to distractions, (2) dealing with distractions at a level which has a minimal disruptive effect upon the flow of instruction, and (3) eliminating distractions. Classroom distractions were defined as those events which take teachers and/or their students off the intended instructional tasks. Coping techniques were defined as mechanisms, verbal or nonverbal, used by the teachers to eliminate a distraction.

Concurrent with conducting their inquiry, the team designed a training program for other teachers. This featured several components from the research methodology, particularly the data collection techniques developed by the team to inquire into their question. In addition, the training design included information about classroom distractions and coping techniques obtained through the team's research study and engaged participants in inquiring systematically into their own classrooms for evidence of these.

Research was conducted in the winter and spring of 1978 in eight classrooms (those of the four teachers on the IR&DT team and four additional teachers matched by grade level). The data set included quantitative coding of occurrences of distractions and coping strategies, narrative descriptions of teacher-student interactions, and other relevant context information for each classroom. Two observers collected the data simultaneously, one recording quantitative data and the other developing the narrative description. Data were analyzed in the spring and early summer. Data interpretation and report writing took place over the summer. The training design was completed and reviewed by the National Advisory Panel in late spring and the training was conducted in the fall of 1978.

Four major reports summarize the California IR&DT team's r and d outcomes: Evolution of the Study, which describes the process the team went through in conducting its r and d; Formal Research Report, which summarizes the conduct of the research and presents findings and interpretations across the eight classrooms; Four Teacher Case Studies, each of which describes the context of two paired classrooms based on grade level taught, as per the matched sample noted above, and presents findings for each pair of teachers as well as teachers' insights about their teaching that resulted from participating in the research; and Formal Training Report, which describes the training program designed and conducted for other teachers and presents results of the training.

The question upon which the Vermont IR&DT team focused its research was:

> Are there relationships between the mood of the teacher and the teacher's classroom supportive instructional behavior? If so, what is the nature of these relationships?

Mood was defined as a state, not a trait. The instructional behaviors selected by the team to be studied for their possible connection with mood were called supportive instructional behaviors (SIBs). A set of such behaviors was selected from existing research on teaching literature. The SIBs included acceptance, attending, conviviality, cooperation, engagement, monitoring, pacing, promoting self-sufficiency, and optimism.

Concurrent with conducting their research, the team designed a training program for other teachers. This featured topics outside their research as well as data collection strategies developed by the team to inquire into their question.

Research was conducted in late Spring 1978 in nine classrooms (none of the teachers was on the IR&DT team). The data set included narrative descriptions of what occurred in each classroom during the reading lesson and each teacher's most difficult time of the day, teacher ratings of a mood adjective checklist (obtained prior to each observation), and observer-teacher interviews. Data were analyzed and interpreted late in the summer. Reports were written in early fall. The training design was completed and submitted for review by the National Advisory Panel in early summer and training was conducted in the fall. Three major reports summarize the Vermont IR&DT team's r and d outcomes: a Formal Research Report, which summarizes conduct of the research and presents findings, interpretations, and conclusions across the nine classrooms; Nine Case Studies for the teachers who served as research subjects, each of which describes the context of the teacher's classroom and discusses findings for that particular teacher; and a Formal Training Report which describes the training program designed and conducted for other teachers and presents results of the training.

IR&DT Implementation

The implementation of IR&DT at the California and Vermont sites was studied from the beginning of the team orientation session held at each site in August 1977 through completion of the final research and training reports in November 1978. The primary data source was audiotape recordings of all team

meetings. Eighty-five hours of formal team meeting time were monitored for each site. This represented more than two-thirds of the total formal meeting time for the California team and approximately half the formal meeting time for the Vermont team. The topics discussed and who was involved in the discussions were scored and summarized. In addition, interviews, on-site observations, and questionnaires were used both to obtain information regarding the extent to which team members carried out the hypothesized roles and responsibilities and achieved parity in decision-making and to monitor the degree to which IR&DT was related to changes in people and institutions.

Using the six essential features of IR&DT as a basis for describing the degree to which a "desired" level of implementation was achieved, the following discussion summarizes the findings.

Team Composition

Based on the role contributions hypothesized as being necessary for a successful IR&DT team, the teachers in both California and Vermont demonstrated the knowledge and skill related to teaching that were considered important. However, based on implementation findings, the California teachers were more aware of and sensitive to the complexity of the classroom environment than were their Vermont counterparts. To some extent, this difference may be explained by the institutional contexts in which the teachers worked. The California teachers had experienced the benefits and frustrations of working in a large, urban, multidimensional school system with a long and sustained history of professional development activities, special school improvement projects, and other opportunities to extend and deepen their understanding of classroom practice. The Vermont teachers were members of a significantly less complex school system which included only one school, provided few inservice opportunities, and isolated the teachers from other professionals. Further, it will be recalled that the three Vermont IR&DT teachers comprised three-fifths of the entire faculty of the school in which they taught. Nonetheless, both groups of teachers demonstrated awareness of and sensitivity to the problems that could arise when classrooms were entered for the purpose of conducting research on teaching, and used these insights artfully during the course of IR&DT implementation.

The California researcher was found to align more closely with the hypothesized need to be knowledgeable about and skillful in approaching the conduct of educational research in a broad and multidimensional manner than was the Vermont researcher. One explanation for this finding may reside in the fact that the California researcher completed his doctoral dissertation during the course of IR&DT implementation whereas the Vermont researcher had completed his graduate work some time prior to his participation in the project. Also, the California researcher, by virture of his position in the school system, was regularly engaged in studying the complexities of teaching and learning whereas the Vermont researcher had been more immediately involved in the formulation and demonstration of a model teacher education program. Both researchers demonstrated the desired combination of (a) willingness to move beyond already-known research paradigms and technologies and (b) effectiveness in sharing their acquired knowledge and skill with other team members.

The trainer/developer on an IR&DT team is expected to demonstrate knowledge and skill in the application of research outcomes and methods to training programs and to be aware of ways to deliver training processes and products to potential client groups efficiently and effectively.

The original Vermont trainer/developer was observed by Far West Laboratory staff and by team member colleagues as being confused about his role on the team, persistently lacking in focus for his work on IR&DT, and, to a degree, in a position of rivalry with the team's researcher. The trainer/developer who replaced the original person can be characterized as task-oriented, supportive of colleagues, and persistent. Subsequent discussion of the trainer /developer role contributions includes only the second Vermont trainer/developer who remained with the team until the completion of IR&DT implementation.

Both the California and Vermont trainer/developers demonstrated the positive contributions to IR&DT that were specified for the role, although different vantage points and different emphases were exhibited by each. The California trainer/developer had taught eleven years in elementary schools and experienced five years as a curriculum resource teacher, all of these experiences taking place in San Diego. This accumulation of understanding regarding the problems and issues in that school setting was seen as having had positive effect in terms of the trainer/developer's knowledge of the system at both conceptual and strategy levels. The Vermont trainer/developer, although working in several school districts in a cooperative teacher education program which provided preservice students experience in public school programs, had as her primary workplace a university college of education. Thus, she was at least one step removed from the issues and problems faced daily by the teachers and others in the school systems with which she interacted. These differences in the trainer/developers, essentially institutional in nature, are believed to be related to the degree to which they were knowledgeable about and sensitive to the perceived reality of classroom teachers. There is some evidence to suggest that the California trainer/developer was more closely aligned with these perceived realities.

Although both trainer/developers demonstrated a repertoire of understandings related to teacher education, as evidenced in observed behavior and self-reports, the California trainer/developer appeared to have a more eclectic and less well-defined approach to training than his Vermont counterpart. The Vermont trainer/developer, by conviction based upon prior experience and training in special education, was more firmly disposed toward a single paradigm for training. This might be called a rational-empirical model dependent upon specification of outcomes prior to instruction, linearity of planning and execution, and accumulation of evidence related to the accomplishment of specified objectives. Although she appeared to become more flexible and accepting regarding other training models during the course of the IR&DT implementation period, there were repeated attempts on her part to recast the team's decisions regarding training into the rational-empirical framework.

Collaboration

As noted earlier, collaboration was hypothesized as being present in an IR&DT effort when there was parity among team members, equal responsibility in

working through the r and d, working with as opposed to working on teachers, assumption of work by team members based upon their role expertise, assistance across roles as tasks were identified, and emergent or issue-specific leadership as opposed to designated or appointed leadership.

Findings demonstrated that, within the broad rubric of parity, i.e., equal ability to gain the attention of the team members, researcher members of both teams were likely to participate more extensively in team meetings than other individual team members because of their knowledge and skill related to research methodologies (the California researcher contributing 24.14 percent of the input across all team meetings and the Vermont researcher 26.15 percent). However, when teacher representation on the team was viewed as the product of all teachers representing one role function, the teacher input was higher than that of the researcher or trainer/developer (59.36 percent for the California team and 52.25 percent for the Vermont team). Regardless, the implementation of IR&DT demonstrates that the need for role expertise may be at odds with a simplistic notion of parity. For example, as suggested above, to deny team members the opportunity to learn from and react to the researcher during the research phase of their work only to maintain some equality in terms of time and attention would have been senseless. Parity had to be considered in concert with the needs of the team. The California and Vermont IR&DT teams attended systematically and sensitively to the issue of parity while at the same time acknowledging the need to provide for inclusion of certain "role" member skills when they were of potential utility.

Regarding responsibility for equal assumption of role-related functions in dealing with r and d problems, the two teams appeared to demonstrate different patterns of behavior. The California team was more participatory than the Vermont team in terms of r and d relevant interactions, whereas both teams were participatory in dealing with issues of collegiality and what might be termed personal support. Analysis of formal team meetings, interviews with participants, and analysis of correspondence indicated that the Vermont team depended to a considerably larger extent than the California team on the assumption of responsibility for the r and d designs and final reports by the researcher and the trainer/developer. The California teachers actively participated in all phases of the r and d including report writing. Further, the California team engaged in more substantive and procedural discourse regarding r and d procedures and products (especially the formal, written ones) than the Vermont team.

The California team engaged in systematic discussion, formulation, review, critique, and revision cycles at almost every step of the IR&DT process, while the Vermont team only began to assume a systematic approach to their work when they entered the data collection step in their research.

What was seen, then, was collaboration at both sites but collaboration which included a more pronounced substantive focus in California. To illustrate, based on percent of total monitored talk segments for all IR&DT team members during the total IR&DT implementation period, the California team devoted 74 percent to research-related talk, 14 percent to development-related talk, and 12 percent to other talk. The Vermont team devoted 56 percent to researchrelated talk, 12 percent to development-related talk, and 42 percent to other talk.

Thus, while both teams achieved parity among team members, the California team demonstrated more equal assumption of r and d functions based on the individual team member's expertise, engaged in more systematic enactment of their respective roles, conducted an r and d effort that assumed a "work with" stance during more steps in the process, and worked with a leadership pattern vested in the researcher that was more substantively oriented than that of the Vermont team.

Problem Solving Focus

Relative to the problem focus for the r and d of the two teams, it is apparent that the California team's work was linked theoretically and practically to an issue which has a long history of attention by both research and conventional wisdom. On the other hand, the Vermont team's work had elements of historical attention (supportive instructional behavior) but conceptually depended upon a difficult-to-define human construct, mood. It might be concluded, therefore, that the California problem was a practice-related one with high visibility in local and national classroom settings whereas the Vermont problem was a person-related one which may or may not be found in subsequent inquiry to be central to the teaching-learning environment of the classroom.

Further, the California team made early and persistent attempts to determine, formally and informally, whether what they planned to study was as important to other teachers as it was to the teachers on the team. In contrast, the Vermont team presented a list of issues to teacher colleagues asking for a ranking of interest but then engaged in more extensive systematic validation only as a consequence of Far West Laboratory technical assistance, which emphasized the need for validation.

Conducting Concurrent R and D

Both IR&DT teams exhibited enthusiasm for the possibility of temporal and conceptual linkage between the r and d they were expected to accomplish during the implementation period. The inclusion of a trainer/developer on each team provided the groups with a persistent monitor of the entire implementation process for potential development activities. Although in actuality development was given concerted attention only near the completion of the data collection stages of the research phase for both teams, there were repeated instances of attention to activities and procedures which might be used in the teams' training/development efforts from the beginning of the research effort, i.e., with the inception of question identification, particularly by the California team. As both teams began to consider systematically the training/development they would formulate, there was a consistent belief expressed that the procedures in which they, themselves, had engaged during the research phase would be powerful training opportunities for others. Consequently, as can be seen by examining the two teams' final training reports, both training programs included elements of the IR&DT process itself and the respective team's research procedures as well as opportunities to examine and understand the team's research findings.

Thus, it can be concluded that the essential feature of concurrent attention to r and d was present in both teams. By this we mean that, in terms of team action, r and d overlapped conceptually such that a Venn diagram might illustrate properties which were in common from one phenomenon to another (research to development) but it also would illustrate properties of the same two phenomena which were separate. A more precise descriptor of what occurred might be "concurrent attention to and proximate implementation of r and d".

Maintaining the Integrity of the Classroom

Because much of conventional educational r and d was viewed as imposing artificial controls upon classrooms and persons in them, thereby transforming conventional aspects of a well-known social institution into one that was unrecognizable to practitioners, IR&DT has as an essential element the requirement that classrooms, teachers, and students be allowed to remain as natural as possible during the conduct of r and d.

Within the IR&DT strategy, it was believed that this element would be accomplished by ensuring that teacher sensitivity to classroom life was a major data source when decisions about r and d were made. This sensitivity was expected to result in greater-than-usual attention to the complexity of the classroom and reflection of that complexity in the data collection and intervention strategies formulated for the r and d.

This feature of IR&DT was realized at both sites. The two teams were resolute in their attention to maintenance of the classroom as a natural setting. Although observers were introduced into classrooms, a period of orientation and "getting acquainted" preceded data collection. Further, even the monitoring equipment (e.g., miniature lapel microphones for the California teacher subjects) was selected after a thorough search of available equipment with the principal criteria for use being the effectiveness of the equipment in terms of requirements of data collection and unobtrusiveness when in use.

IR&DT as an Intervention Strategy

One of the essential elements of IR&DT was recognition that participation in an IR&DT effort could serve as a change and/or professional development vehicle for the sites and the participants. Participation in IR&DT did appear to have consequences for individual participants and for cooperating institutional settings. It was shown that participants increased their awareness of educational options and possibilities partly as a consequence of the requirements of systematic inquiry into schooling. Although the evidence suggested that the Vermont team benefited more extensively on this dimension of the strategy, it should be remembered that the California team members, especially teachers, exhibited entry-level behaviors which might be termed more professionally sophisticated than those of the Vermont team members.

An intervention outcome that was sharply evident was the increased knowledge and skill regarding educational research and development exhibited by the participants. All members of both teams, through observation and self-reports, can be said to be more knowledgeable about, skillful in, and sensitive to research and development issues as a result of their participation in the implementation of IR&DT.

In addition, the historically persistent condition of teacher isolation was ameliorated for the participants. Teachers related one to another and to the researcher and trainer/developer in ways which were not typical. Systematic, focused, and interactive inquiry provided avenues of and for professional communication which had not been a usual pattern in their worklives. The institutional isolation, school from school and school from university, also was reduced to a degree. The concerns of the team and the actions upon those concerns "forced" the institutional relations which came about in the course of the implementation period.

Another intervention outcome was an increased belief that the work of other team members was of value and otherwise "prestigious" in their immediate workplaces and in the broader educational community. The combination of increased capacity to deal with r and d issues and the belief that the work which emerged out of that capacity was of positive value are seen as powerful antidotes to growing sentiments that teaching and teachers are of low status and low priority in terms of social action and reward systems at local and national levels of authority.

Although IR&DT did not have as an initial intention the significant alteration of professional practice by participants, such alteration did take place. Self-reports from participants indicated that teachers changed some of their instructional patterns, researchers learned and demonstrated new skills, trainer/developers revised and reordered certain beliefs and practices regarding teacher education, and so on. Some of these changes were a consequence of the <u>issue</u> under study in the teams' r and d efforts, some a result of the <u>processes</u> engaged in during such study, and some related to the requirements of <u>interaction</u> with other educators.

There also was an indication that participants began to rely less upon what might be called "conventional wisdom" and more upon prior research and/or expert testimony as their work proceeded. On both teams, although more markedly so for Vermont, initial discussions were informed more often by what individual participants had experienced than by findings from more systematic inquiries into the issues. Particularly true for teachers, less so for trainer/developers, and occasionally so for researchers, team members eventually came to question one another and others regarding the accuracy of statements, reports, formulations, and the like. It is believed that IR&DT contributed to this shift partly because of the requirements of conducting research and partly because of the technical assistance aspects of the implementation.

<u>Judgment of IR&DT Teams' R and D Outcomes</u>

A basic assumption which has persisted from the intial planning period through the implementation of IR&DT is that research and development conducted in this mode will provide useful knowledge and contribute to theory development. To judge the r and d outcomes of each team in respect to this assumption, two constructs provided appropriate guidance: "rigor," intended to convey strictly precise, exact, accurate adherence to scholarly inquiry in terms of methods and procedures; and "usefulness," meaning to be of practical use in doing one's work.

Six juries were organized to judge the teams' r and d outcomes for rigor and usefulness. Each jury was comprised of three persons. Juries were organized to reflect particular biases from among the constituent users of educational r and d, each of whom was considered to be expert in his or her respective educational role: teachers, researchers, teacher educators, and staff developers. Juries included (1) a jury of three researchers that judged the rigor with which research had been conducted as reflected by the research reports; (2) a jury of three researchers that examined the degree to which research as reported contributed to new knowledge and/or theory development; (3) a jury of two teacher educators and a staff developer that judged the rigor of the training as reported; and (4) three juries (a teacher jury, a staff developer jury, and a teacher educator jury) that judged the r and d outcomes from each site--both research and training as reported--for usefulness to their constituents.

Each jury met separately for one day. All meetings were scheduled within a two-week period in February 1979. Jurors were asked (1) to develop criteria for either rigor or usefulness, whichever was the jury's focus; (2) to use these to make independent judgments of each team's r and/or d in comparison with what the juror knew to be typical of educational r and d; and (3) to bring criteria and judgments to the meeting. Meetings were audio-recorded, transcribed, and served as the basis for the reports of jury deliberations. In addition, each juror reviewed the report of the deliberations for his or her jury for purposes of accuracy.

Seven additional experts representing the same appropriate constituencies and six counterpart constituents from each team's site responded to items on a questionnaire in relation to the team's r and d reports.

As a result of the judging of the IR&DT teams' r and d outcomes by the juries and experts, conclusions can be drawn about the r and d outcomes resulting from use of the IR&DT strategy. In addition, because the juries were required to generate the criteria to be used in judging the teams' work, information also is available relative to the content and characteristics of these criteria. In turn, the judgmental criteria and the jury procedure provide an exemplary model for judging the outcomes of other educational r and d efforts.

Rigor and Usefulness of R and D Produced by IR&DT Teams

Researchers judging the California IR&DT team's research found it to be somewhat more rigorous than typical educational r and d. As well, it was judged to be moderately useful for knowledge building and theory development by the jury looking at usefulness of the research findings to other researchers. In terms of the rigor of the training, jurors found the California training to be slightly more rigorous than typical training programs. Teachers judged the total California r and d effort to be much more useful than typical educational r and d. Both the staff developer and teacher educator juries concurred with this judgment.

Vermont's research was judged to be somewhat less rigorous than typical educational research. Relative to the contribution of the research to knowledge building and theory development, the second research jury judged the Vermont

outcomes to be scarcely useful. The Vermont training program was judged to be slightly less rigorous than is typical for educational training programs. Teachers found the Vermont r and d effort as a whole to be not at all useful, but staff developers judged the total effort to be somewhat more useful than is typical for educational r and d and teacher educators judged it to be as useful as other educational r and d.

In general experts that rated the products using questionnaires were as positive as were those on the juries regarding the California team's r and d outcomes. In the case of the Vermont r and d, however, experts were more positively disposed than were the juries. This was true for all three categories of experts--teachers, researchers, and teacher educators. One reason this might have occurred may be the nature of the task. Experts responded to tightly constructed items on a questionnaire while juries developed their own criteria and judged products conceptually. Other factors which might have contributed to the differences in the judgments were the fact that the experts worked in isolation from each other and did not have the opportunity for interaction as did jurors, and experts were not required to reach consensus as the jurors were.

Role counterparts at each IR&DT site--like and unlike counterparts for teachers, researchers, and trainer/developers--read the r and d reports for the team at whose site they were located and responded to the same questionnaire as the experts. Site role counterparts at both sites were more positively disposed toward the r and d produced by the "local" team than were either the experts or the juries. An explanation for these higher ratings might be that counterparts' expectations were different in that r and d activities of the sort engaged in by each team were unusual activities for those settings. Further, the counterparts' judgments most likely reflected knowledge of the respective site contexts in terms of needs, problems, and capabilities that was not available to the juries or the experts. This knowledge, coupled with the norms applied to educational r and d at that particular site, may suggest that IR&DT outcomes are of even greater value when the specific needs of local educational institutions and practitioners are considered rather than the needs of institutions and practitioners in general.

Content and Characteristics of Rigor and Usefulness Criteria.

A major contribution of the IR&DT Study is the criteria for rigor and usefulness generated by the six juries. Such criteria, usually used only implicitly to convey degrees of scientificness and utility, can be made explicit. Juries had little difficulty in reaching consensus on which criteria to use in their judgments of the IR&DT teams' r and d outcomes. As well, each was able to use its criteria successfully for judging degrees of rigor and/or usefulness by comparing independently each team's r and d outcomes as presented in their respective research and/or training reports with those typically found in educational r and d.

From the six juries, a total of 41 major criteria were generated. When subparts of these are included, the juries, in combination, applied a total of 94 judgment points. The number of discrete criteria generated by a single jury ranged from a high of 30 to a low of 6. The largest number of criteria

was developed by the jury that evaluated the teams' research reports for rigor of the research. The fewest criteria were generated by the staff developer jury that evaluated the usefulness of each team's total r and d effort.

The criteria used to judge rigor differed from those used to judge usefulness. For example, even though researchers who represented similar experiences and perspectives served on the juries, when asked to develop criteria for rigor or for usefulness, they tended to look at different aspects of the research. This occurred when criteria were given similar labels as well as when totally separate criteria were applied.

When the usefulness criteria developed and applied by teachers, staff developers, and teacher educators were compared, differences also appeared to exist. Generally, it can be said that the criteria developed by these practitioner groups reflected broadening interests in teaching and teacher training as one moved from the teacher to the staff developer to the teacher educator jury. Teachers focused almost exclusively on their constituency in generating criteria. That is to say, they stressed the immediate usefulness of the r and d in a classroom setting. Staff developers considered the needs of classroom teachers as well as themselves when generating criteria. Teacher educators included usefulness to teachers, teacher trainers--whether staff developers or teacher educators--and researchers. In addition, both the staff developer and the teacher educator juries chose to consider other collaborative r and d efforts with which they were familiar in developing and applying their usefulness criteria such that potential usefulness of the IR&DT strategy as enacted by each team could be judged as well as the individual team's r and d outcomes.

Further, criteria that were generated and judgments that were made indicated that what constitutes rigor does not necessarily constitute usefulness. For instance, in the case of the California IR&DT team's research, the rigor jury judged it to be somewhat more rigorous than typical educational research but the usefulness jury perceived it to be only moderately useful in terms of contributing to knowledge building or theory development. In addition, while the rigor jury found the Vermont IR&DT team's research to be somewhat less rigorous than is typical for educational research in general, the usefulness jury judged it to be only scarcely useful for knowledge production and theory development.

This contrast between rigor and utility also was revealed in the judgments rendered by juries looking at the training for the Vermont team. The rigor jury found the training program to be almost as rigorous as the typical educational training program. However, teachers judged this same training program to be not at all useful even though both the staff developer and teacher educator juries found some value in it. The rigor jury found the California team's training to be only slightly more rigorous than is typical of educational training programs, although when judging the topic as a training focus (single criterion), they indicated it was more rigorous. On the other hand, all three usefulness juries rated the California r and d to be much more useful than typical educational training programs.

Thus, it appears that a product--research or training--which adheres to rigorous standards cannot automatically be assumed to be useful. In that both rigor and usefulness are important considerations, based on the judgments made in this study it can be concluded that serious consideration should be given to validating the usefulness of "potential" r and d outcomes before undertaking rigorous procedures to produce them.

What Was Learned About Implementing IR&DT

Six notable findings that have relevance for future applications of IR&DT emerged from the implementation study. These may be summarized as follows.

1. The characteristics, skills, and previous experience of participants appear to affect the degree to which IR&DT is implemented with high occurrence of/congruence with the essential features of the stragegy. The presence of these features, in turn, is related to the rigor and usefulness of the r and d outcomes.

Beginning with the orientation sessions and proceeding throughout the implementation period, the California IR&DT team dealt with r and d issues systematically, persistently, and methodically. The team's procedures also were characterized by high involvement of all team members at each stage of the process. This involvement took different forms--shared responsibility alternating with specific group-mandated assignments for certain tasks and with whole-group critique and revision--which, taken altogether, were linear and rational.

The Vermont team, again from the orientation period throughout the study, illustrated a more erratic, less rational pattern. Particularly during the early stages of the implementation period, the Vermont group's efforts were somewhat sporadic in terms of coming to grips with the essentials of the r and d process. The team's apparent preoccupation with the personal-social dimensions of its members' relationships may have influenced the degree to which it could effectively and efficiently accomplish its primary IR&DT missions: the formulation and conduct of r and d on teaching.

This raises the important question of why this difference was present. For the most part, this can be explained by looking at team member knowledge, skill, and performance.

As was noted earlier, the Vermont trainer/developer role was filled by two persons, one of whom replaced the original member three months into the implementation period. The first trainer/developer was characterized as being much more interested in human relations' processes than in educational research and development. He appeared to use the term "interactive" more in terms of team processes than for the interrelationship of r and d. In addition, he exhibited confusion as to which role functions were most appropriate to the IR&DT effort. The period of his membership on the Vermont team was significantly less task-oriented and IR&DT-specific than subsequent periods of the team's interaction. Because the period of his membership coincided with the critical research design formulation phase of IR&DT, upon which much, if not most, of the subsequent efforts were based, it is informally hypothesized

that, had the second trainer/developer been a team member from the beginning of the effort, the consequences and processes of implementation would have been different.

Another phenomenon was the apparent reluctance of the researcher on the Vermont team to assume substantive leadership during the early research phase of the project. Although the researcher was acknowledged by the team members as the leader throughout the implementation period, the nature of his leadership was, for some time, more procedural and human-relations oriented than it was research oriented.

The relative differences between teacher members of the two teams, in terms of prior experience related to "special" innovative program activities, also is considered to be critical to the process and product of IR&DT. The California teachers had had experiences which were aligned with the assumed requirements of IR&DT--using teaching as a base for changing institutional behavior, responding to and engaging in externally-required information gathering and report writing, working on school improvement projects, participating regularly in professional development activities, and the like. The idea that IR&DT was somehow "exotic" to the setting was expressed only minimally by the California teachers but was pronounced for the Vermont teachers. What might be concluded is that the IR&DT experience was better accomplished by persons, particularly teachers, who had had other similar experiences during the course of enacting their professional roles.

2. Commitment to educational r and d and previous involvement in such efforts by the participating institutions also influences the conduct of IR&DT.

There is believed to be a relation between institutional history and successful IR&DT based upon the data collected for the implementation study. The more successful team was located in an organizational context which was marked by decades-long attention to issues of professional development; curriculum revision; innovative program development, implementation, and evaluation; involvement in to state and federal special programs; support of an organizational unit designed to support and encourage professional growth; and so forth. The Vermont team, however, was located in a setting which had a history of sharply less attention to such issues. In California, then, there was a set of institutional norms, expectations, and support mechanisms which were barely present, if present at all, in the Vermont context. For the Vermont team, it was necessary to create a new setting. In contrast, for California it was necessary to determine how best to use the accustomed setting.

3. Orientation to IR&DT is important. It should be designed to fit the needs and context of the participating people and institutions. If the required participant skills do not exist, training in these skills should be included.

The orientation sessions held prior to initiating IR&DT were found to be important. The differences between the two teams at the time of entry into IR&DT--these differences becoming more evident over time--suggest that the orientations which purposely were similar in content and process should have been conducted differently with different foci and different emphases. Although it was not conceived originally as such, IR&DT, like other school change efforts, appears to be situationally-specific. That is, knowledge of the

context and the participants should influence to a marked degree the nature and expected outcomes of IR&DT orientation. Most likely, such intervention should include training participants in the skills they lack given what has been learned regarding the relation between appropriate participant characteristics and successful IR&DT.

4. Technical assistance should be available throughout an IR&DT effort.

Even the most exemplary schools and school systems often can be described correctly as "closed systems." Thus, introduction of external perspectives, input, and monitoring is desired in IR&DT regardless of the location of the effort and the surrounding support structures. From the beginning of the IR&DT experience, it was apparent that the technical assistance provided by the Far West Laboratory staff and a National Advisory Panel comprised of two researchers, a researcher/developer, and a teacher played an important role. The role played was what the term implies, assistance of a technical r and d nature. Occasionally, however, the role could be characterized as being more personal-professional. That is, in addition to offering r and d information and advice, it was beneficial to let the participants in the process know that "someone cared" about their efforts and to make public that caring. The importance of technical assistance of both types was seen during the implementation period in terms of the impact upon what was done, and how IR&DT members felt about what was done, and the rigor and usefulness of the outcomes.

5. The typical time lag between research and development can be reduced with the IR&DT strategy.

The implementation of IR&DT by the two teams demonstrated that IR&DT can reduce the typical time lag between production of research findings and development of training opportunities based on those findings. One reason for this reduction in time, it must be admitted, was the external imposition of contract requirements by Far West Laboratory which grew from its own contractual commitment with NIE. In addition to these externally imposed deadlines, dimensions of IR&DT also appear to have contributed to the reduced time lag. First, both teams believed that the research procedures and team interactions during the first phases of IR&DT were so beneficial to them that they included these aspects of the IR&DT effort in the training opportunities they developed. Therefore, the processes which were adopted for training were ones which were familiar, had been experienced, and were conceptualized as a consequence of that experience and familiarity. Second, since the trainer/developer was involved in the r and d process from the beginning, it was not necessary for a "naive" developer to engage in the difficult and arduous tasks of translating and transforming the research processes and findings for the purpose of formulating a development vehicle. This overlap of procedures and persons in the form of IR&DT membership and activities is seen as a powerful contribution to the much more efficient r and d cycle which was demonstrated during the implementation. However, all team members recommended that the time allotted to IR&DT be increased from 15 months to 24 months in future efforts. It is not known whether more time available would have enhanced the r and d outcomes but even a 24-month cycle would be significantly shorter than is typically the case.

6. IR&DT implementation can be cost-effective.

Relative to cost-effectiveness, it can be said that IR&DT is at least as effective as the more conventional linear approach to conducting educational r and d. In fact, in the case of the California team, IR&DT resulted in research that was more rigorous than that produced by the typical educational research study at no more cost. Further, in terms of usefulness to practitioners, the more an IR&DT team's efforts evidenced the essential features of the strategy, the more useful practitioners perceived the outcomes to be. That is, when the teachers, researchers, and trainer/developers on the IR&DT team gave a high degree of attention to the essential features that underie the IR&DT strategy and carried out the role functions specified for each team member in a systematic, thorough manner, the outcomes of their work were considered to be applicable in the classroom by teachers, to be immediately useful for purposes of inservice teacher education by staff developers, and to have immediate use in preservice as well as inservice teacher education programs by teacher trainers who worked in institutions of higher education. In addition, given the changes in persons and institutions that were observed in the IR&DT Study, the strategy appears to be a viable approach to educational change as well as to the conduct of r and d.

It should be noted that such outcomes of an r and d strategy are in marked contrast to the dim picture of the usefulness of educational r and d that is presented in much of the literature, particularly with respect to the ability of educational dissemination (change) efforts to bring about change (improvements) in persons and institutions involved in the educational process. IR&DT appears to have "cracked" this wall of practitioner resistance while at the same time contributing new knowledge, procedures, and processes to the field of teaching that were derived rigorously, particularly in terms of the California IR&DT effort.

However, the cost of conducting educational r and d in this manner is a matter for further conjecture. Several essential features of IR&DT suggest that the strategy should be more costly than other approaches to educational research in that unusual costs must be considered. In particular, teacher participation on the IR&DT team should add costs, e.g., payment of teachers for extra hours beyond the regular school day and/or hiring substitutes to release the teachers to work on the r and d team, that are not usual when research is carried out in absentia of regular, ongoing teacher input. The early and continuous involvement of the trainer/developer also is a cost item that typically is not included in a research effort.

Costs such as these must be counter-balanced by the extent to which the teachers and trainer/developer on an IR&DT team assume responsiblities that would be carried out by paid research assistants in research efforts conducted within a conventional framework. When this is done, IR&DT costs may not vary to a significant extent from those for other approaches to r and d. Further, in assessing the cost of IR&DT efforts it must be kept in mind that both the California and Vermont teams completed the development of a research study and a teacher training program within a 15 1/2 month period. Once the research was completed, so was the development. This shortened time line actually may contribute to lowering overall r and d costs.

Including the costs of external review by the National Advisory Panel and the technical assistance offered by Far West Laboratory staff, the total costs for the r and d work of the California IR&DT team were $99,317. The Vermont team's total costs were $88,153.

These costs are comparable with the cost of a typical research effort sponsored by a federal education agency. Further, if the typical cost of a federally funded research effort is combined with that for a typical development effort--which in a linear approach to educational r and d follows after the research as a separately funded activity--the costs for conducting r and d using the IR&DT strategy were surprisingly low. To obtain both research and training products for the amounts listed above was an economic path to take.

Future Recommendations

Based on the overall findings and the information obtained in the IR&DT Study relative to the requirements for successful implementation/application of the IR&DT strategy, the following recommendations are advanced regarding the strategy.

Recommendation 1

> The IR&DT strategy should be used for conducting a portion of the educational r and d effort at the national, state, and local education levels. The more the r and d outcomes are intended to result in improvements in education that are to be used in classrooms by teachers, the more important the use of the strategy becomes.

The value and workability of the IR&DT strategy has been demonstrated in the implementations that were carried out for the purposes of the study reported herein. In particular, the California IR&DT team demonstrated the potential worth of the strategy to the field of education.

Given that an enactment of IR&DT at a high level as per the essential features of the strategy results in research outcomes that are considered to be the product of rigorous inquiry and are seen as more useful than most research outcomes by practitioners, IR&DT warrants use as an r and d process.

Further, regardless of the quality and worth of the products produced via IR&DT, the strategy also has been shown to be an effective mechanism for bringing about changes in people and institutions that previously have been difficult to accomplish. Such changes were particularly evident for the participants in the Vermont IR&DT implementation effort.

However, because of the limited length of the IR&DT Study and the use of only two implementation sites, questions remain regarding such factors as the permanence of the changes that occurred in institutions and participants and the actual adaptation/use of the r and d outcomes.

Hence, there are limitations in the recommendation. We encourage the use of IR&DT to increase participation of teachers as equal partners in r and d, to increase the perceived usefulness of r and d, and to provide a powerful personal and institutional change strategy for school problem solving. At the same time, we recognize that IR&DT should be considered as one of several viable r and d strategies. As indicated in the recommendation, a decision to use IR&DT should take into account the intended results of the r and d effort. For some knowledge and theory building purposes, IR&DT most likely is not the best r and d strategy to apply, but for others it most likely is. When making this decision, the goals of the proposed r and d effort should be taken into account. Regardless, teachers, researchers, trainer/developers (teacher educators and staff developers) and federal and state funding agencies are urged to consider IR&DT as an available and productive option for conducting educational r and d.

Recommendation 2

> Site and participant selection and/or training of participants prior to initiating IR&DT efforts are important antecedents to enactment of IR&DT in an "ideal" form. This is particularly important because ideal conduct of IR&DT is necessary for achievement of r and d outcomes that are more rigorous and more useful than "typical" educational r and d products.

The entry level skills and experiences of the California and Vermont IR&DT participants differed considerably. The California participants' r and d skills had been developed and applied on a regular basis in their respective positions in the school district. They had participated in the planning and implementation of several innovative classroom-based instructional programs and they were able to analyze and structure instructional programs in terms of various types of needs. The Vermont participants lacked most of these experiences and had had little recent training in research, development, or teaching skills.

Further, the institutional support system available in California was more extensive and facilitative than that in Vermont.

The differences in the way the California and Vermont teams enacted the IR&DT strategy and in the outcomes of their r and d efforts also were marked with the California team achieving a more "ideal" enactment of the strategy than the Vermont team and the California research and training products receiving substantially higher rigor and usefulness ratings by other researchers, trainer/developers, and teachers.

However, in terms of professional growth and institutional change, the changes that occurred as a result of participation in the IR&DT effort were greater in Vermont than California.

These data suggest that when r and d is being conducted for the purpose of contributing to the advancement of knowledge in the field of teaching (or in other areas of education), thereby necessitating high quality outcomes, the site(s) and participants should either possess the skills, knowledge, and

support characteristics evidenced by the California team or, if such do not as yet exist prior to initiating IR&DT, training should be designed and conducted to build them.

If, on the other hand, the IR&DT strategy is being used for intervention purposes--that is, to bring about change in persons and institutions as a means for improving a local education program--one may intentionally elect to begin where persons and institutions are lacking in the "desired" skills. Even in this situation, orientation to IR&DT should be designed to provide experience in analyzing and restructuring instructional programs and to acquaint the participants with what is to be done at each of the r and d steps to be carried out by the team. This is particularly important when the researcher on the team is lacking in r and d experience. Otherwise, the work of an IR&DT team could become of such low quality that the changes that did occur might not be desirable.

Recommendation 3

> Some form of external review and assistance is recommended for all IR&DT efforts.

Three aspects of the IR&DT strategy make it essential to utilize external resources since each demands more expertise than one reasonably can expect to find on any given team. These aspects are: (1) the complexity of the problems teachers identify for study, (2) the use of multiple research strategies that most often is required by the problems that are selected, and (3) the ideological "shakeup" that is a "normal" occurrence in an IR&DT effort.

Both the California and Vermont IR&DT teams selected research issues that were challenging and complex. Arriving at operable, observable, measurable definitions/descriptions of variables such as distractions and coping strategies (in the California research) and mood and supportive instructional behaviors (in the Vermont research) was a difficult task. An important role in "tightening up" and improving the research design for both teams was provided by input from Far West Laboratory staff and the National Advisory Panel regarding identification of (a) research efforts in which similar variables had been studied, (b) strong and weak points in various definitions, (c) alternative ways to measure the variables, etc. Further, review and critique of the Vermont team's thinking regarding the variables to be studied and the procedures to be used to obtain information about them was considered essential to the quality of the r and d by the National Advisory Panel and Far West Laboratory staff and was seen as helpful by the Vermont team members, particularly the researcher.

As might be expected in a research study that is to take place in the "natural" classroom setting, the researcher on the California team found that he needed to utilize data collection and analysis methods with which he was unfamiliar. As a result, he asked Far West Laboratory staff to train him in ethnographic research methods. Such training was offered to the researcher and trainer/developer on both teams. It is expected that other IR&DT teams will need a similar capability to tap the skills of persons from a variety of research methodologies.

The professional growth that results from participation in an IR&DT effort already has been mentioned. As persons and institutions change, support, guidance, and reassurance are needed. Typically, such help is requested from and provided by people external to the immediate setting in which change is occurring. IR&DT teams need this help.

Recommendation 4

> Changes in resource allocations (funding/budgetary policies) of federal, state and local educational agencies will be necessary in order to utilize IR&DT extensively.

A major feature of IR&DT is that the question/problem that is the focus of the r and d effort is identified by the teachers on the team, usually in collaboration with other teachers in the school district(s). This requirement is imposed in order to increase the likelihood that the research issue will be of high interest and concern to teachers and to stress the problem-solving purposes of r and d.

However, including such a requirement in the IR&DT strategy places the strategy in confrontation with the funding procedures utilized by federal, state, and other funding agencies. Typically, a federal education agency, e.g., the National Institute of Education or United States Office of Education, or a state department of education issues a request for a proposal (RFP) to do work in a problem area that already has been stipulated. Further, in order to obtain funds to conduct r and d related to that problem, the applicant must indicate in advance what will be studied and how and, at times, the RFP even specifies these details of the r and d effort.

Given these circumstances, it is inappropriate to utilize the IR&DT strategy. There is no guarantee that the specific problem identifed by the federal or state agency will be of high priority (concern or interest) to teachers. Most often, prior to being funded, time and resources are not available to bring teachers, researcher, and trainer/developer together to "check out" the problem with other teachers, identify important variables (if such flexibility exists), or try out various data collection strategies to determine whether they interfere with the natural classroom setting.

To alleviate such hindrances to the use of IR&DT, we recommend that funding agencies increase the use of an already existing funding strategy--the planning grant--and, in addition, develop a new policy that allows at least a small portion of the educational r and d effort to be funded on the basis of the skills, experience, background, etc., of the persons and institutions that comprise a proposed IR&DT team.

In the first instance, the planning grant can be used to bring together an IR&DT team to identify a problem/question of high concern and interest to teachers and to design an r and d effort that responds to that problem. Just as the California and Vermont research designs were reviewed and critiqued by the NAP, the federal, state, or other funding agency could conduct reviews of an IR&DT team's design and determine whether to continue funding based on these reviews. The only difference between this use of a planning grant and the

typical use might be in the lack of restrictions on the problem(s) to be studied. Otherwise, this approach uses a common funding tool.

In contrast, funding a team based on its composition--utilizing the site and participant criteria included in Recommendation 2 and the purposes for using IR&DT outlined in Recommendation 1--is a marked departure from typical procurement and funding procedures. Nonetheless, we encourage agencies to explore the possibility.

Another avenue for funding IR&DT efforts is redefinition of dollars and responsibilities attached to staff development, educational evaluation, and educational dissemination positions and practices in a local or intermediate educational agency. The intervention outcomes of IR&DT suggest that persons in these positions would bring about as much, and more likely more, improvement in education if they were assigned to carry out IR&DT efforts as part of their regular work in lieu of workshops, etc. Were this to occur, costs for teacher involvement would have to be considered. But, given that improvement/innovation is desired, reallocation of funds and personnel to support IR&DT teams warrants serious consideration.

Recommendation 5

> IR&DT should be implemented and studied in settings with participants other than those involved in the original implementation.

IR&DT as an alternative mode for conducting educational r and d had teaching as its substantive focus for this initial implementation of the strategy. Further, that focus was upon teaching in the early years of elementary school. The findings of the IR&DT Study suggest that IR&DT may be an appropriate mode for conducting r and d at other levels of schooling and with different foci. For example, problems of administration and leadership, curriculum revision, school organization, school-community relations, school system articulation and the like could be the objects of IR&DT attention. In the event that such extensions of the strategy were put into place, the practitioner role members of IR&DT teams would change to include not only teachers but also administrators, central office staff, community members, and the like. It is considered desirable to determine the degree to which such alterations in membership and problem focus would support or modify the effects of IR&DT which are reported for the IR&DT Study.

Further, the implementation study did not discover as much about the impact upon institutions, particularly higher education institutions, as would be desirable. It is considered necessary to engage in both follow-up and newly-conceptualized studies to determine more precisely the immediate and long-term effects upon institutional settings. In regard to institutional participation in IR&DT, it also is necessary to examine other organizational configurations. For example, what would be the consequences of using IR&DT as part of a school networking strategy? What IR&DT role functions could be provided by linkage agents between and among educational institutions? How would IR&DT impact upon institutional r and d if contained solely <u>within</u> an institution of higher education (IHE) as opposed to IHE representatives working through IR&DT in a public elementary or secondary school? What would be the effect of IR&DT in secondary school settings?

A third issue related to future research is to provide more evidence regarding the findings reported herein. In a study with a larger set of IR&DT teams, some with teaching as focus and others not, would there be support for the elements and findings which were central to the initial implementation? Do the recommended site characteristics and participant role functions hold up as supportive components of IR&DT? These questions and others illustrate the need to obtain data in addition to those provided in this report.

It is believed that the process and product findings in this study support the need for continued investigation and demonstration of IR&DT. Also, it is believed that the study of such further efforts can rely upon many, if not all, of the procedures outlined in this study of IR&DT.